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HINTS ON MASTERING
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BREAK A MILLION! **AT** **PAC-MAN™**

LEARN THE SECRET TO ASTRONOMICAL SCORES
DEVELOP YOUR OWN STRATEGIES

Ernest Zavisca, Ph.D.
and
Gary Beltowski

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BREAK A MILLION! **PAC^{AT}-MANTM**

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by Ernest Zavisca and Gary Beltowski

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1

Before You Begin

The Pac-Man craze is spreading. Midway's Pac-Man and Ms. Pac-Man have hit the arcades; Coleco has a little portable version of the Pac-Man arcade machines; and Atari's new Pac-Man cartridges are setting records in sales, being snapped up by eager Pac-fans as quickly as they appear in retail stores.

This book has been written for all those who play the Pac-Man and Ms. Pac-Man arcade games, and especially for those addicts who really have fun trying to improve their skills. Most of the book applies to the original Pac-Man game and the most widely distributed modified version of it, but parts are even applicable to other brand-new modifications (see chapter 6, "Developing Your Own Patterns"). We'll tell you many tricks to use to outsmart the monsters, and our patterns will enable you to get more game time for your money than ever before. If you used to think that a score like 1,000,000 was impossible, read on! This first chapter contains important information about this book, its objectives, its audience, and its use. You should read this chapter before continuing.

HOW THIS BOOK CAN HELP YOU

The primary purpose of this book is to teach players of the Pac-Man arcade game how to improve their score significantly. There are general concepts, specific guidelines, methods, and detailed patterns that can be followed like a cookbook recipe. Most of the hints and patterns concentrate on survival rather than on taking risks in order to increase chances of a slightly higher point total at a given “board” of the game. (We use the term “board” to refer to one of the sequential screens displayed on the Pac-Man game machine.) The methods can easily be adjusted, however, if you’d like to pursue a more aggressive strategy.

If you have the necessary hand-eye coordination, if you can remember the key techniques, if you are dedicated to practice and the perfection of these techniques, then it is possible that you too can approach or even break that magic million mark at Pac-Man!

Even a beginner who has had minimal exposure to the game should be able to follow this book; intermediate and advanced players will be able to progress quite rapidly through some portions of the first few chapters.

HOW TO USE THIS BOOK

Players at different experience levels will proceed through the book at various paces. If you are a beginner at the game, go sequentially through all the material. Read the entire book.

If you consider yourself an intermediate at the game, then you will probably want to skim over chapter 2, “Pac-Man Game Definition and Rules.”

If you are an advanced player, then you may want to skip chapter 2 entirely. And in the following chapters you

may want to substitute some of your own ideas for parts of the proposed techniques in order to retain certain moves and concepts with which you feel more comfortable. But chapter 4, “The Patterns,” contains the special material that can help you break a million.

All readers should read chapter 3, “General Helpful Hints.”

Chapter 4 contains complete and detailed patterns, displayed on realistic Pac-Man game-board drawings. As you analyze the suggested pattern for a particular board of the game, it is recommended that you try to commit it 100% to memory before using it in the game. One good way to do this is to practice it on the blank game-board diagrams provided in chapter 8. After you are able to go rapidly through the pattern on a blank board, you will be well prepared to use it on the real machine. Chapter 4 also contains memory aids to help you both learn and review the patterns.

Chapter 5 describes (and tells you how to master) one widely distributed modification of the original Pac-Man machine, and chapter 6 offers some general guidelines for developing your own patterns on either the original Pac-Man machine or any modified Pac-Man machine.

Chapter 7 introduces you to a new arrival, the Ms. PacMan machine, and presents several helpful hints for tackling that fiendish little advance in technology.

Individual Pac-Man players may have their own terminology for specific elements of the Pac-Man game. Each special term in this book will be enclosed in quotation marks when first used and will be defined at that point.

SPECIAL NOTE

The strategies, patterns, concepts, and guidelines put forth in this book are based on the authors’ experience with the

Pac-Man games available to them. Specifically, this applies directly to the original Pac-Man game (chapter 2 tells how to establish for certain that you are using this particular machine). At this time, the original machine is probably the one with which most readers are familiar. This text may not be completely applicable to future Pac-Man machines, or to all modifications of the original. However, there is one authorized-machine modification to which the entire book can be applied with only slight changes. Chapter 5 tells you how to identify such a machine and how to apply the patterns slightly differently for that case.

The degree to which you can improve your game depends on a number of factors:

- Your skills and coordination
- Your total experience with the game
- The amount of time, effort, and practice you put in
- Whether you properly apply the guidelines and patterns shown in this book

A score exceeding 3 million points (2 1/2 million on one man) has been reached by one of the authors of this book. Now you can share our winning techniques and patterns. Unfortunately, not everyone is likely to reach game totals near that mark. But with proper application of the material contained in this book, you should be able to keep those Pac-Man jaws chomping for longer than ever before!

2

Pac-Man Game Definition and Rules

There is currently more than one version of the Pac-Man video game in public locations. As stated above, the most familiar machine is the original one, which this book therefore discusses. The way to identify the original one is as follows: Refer to Figure 1, a representation of the game board, on page 10. Notice the spot indicated as **C** on the figure. Then (before you put your money in) watch the animated activities of the pregame show on your machine. If the Pac-Man is captured by the monsters at point **C** during these pregame activities, it is the original Pac-Man game.

THE GAME BOARD

Review the game board or screen shown in Figure 1 on page 10. The diagram shows all the important lines from the actual game. You should recognize the lines and the structure. Certain text and figures, unnecessary for our purposes, are omitted for the sake of simplicity. The heavy lines show the perimeter of the board. The Pac-Man must travel within the perimeter, and cannot enter any of the shaded areas. At any time you can move him only in a straight north, south,

east, or west direction. The Pac-Man begins each board at the starting point, **S**. The only point of discontinuous movement is the tunnel, **T**. If the Pac-Man or a monster enters the tunnel, he will reenter the board from the tunnel entrance

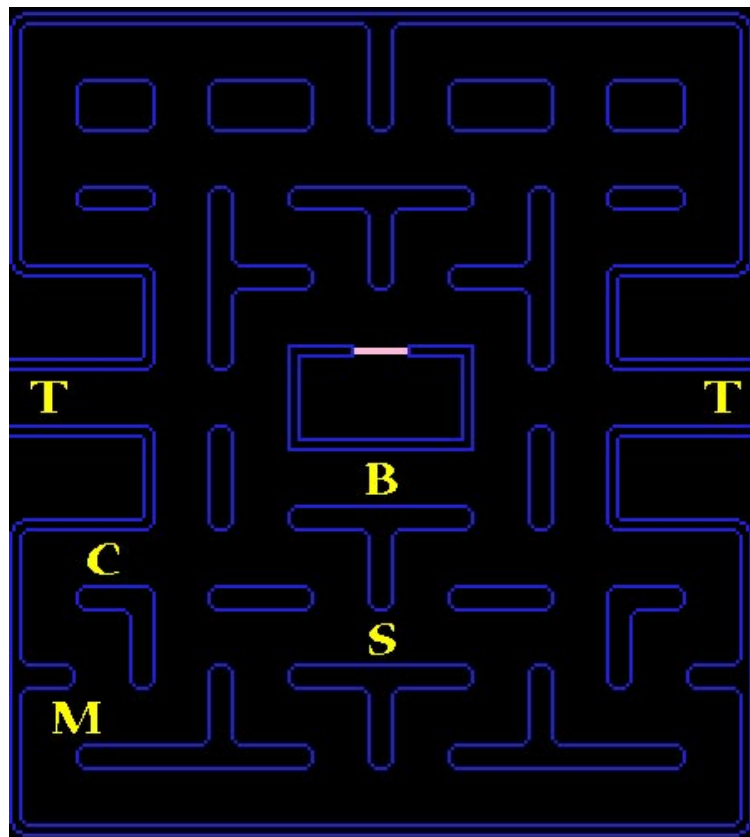


Figure 1. The Game Board

on the opposite side of the board, displaying a wraparound effect. The Pac-Man stops if you try to move him head-on into any of the walls or boundaries.

You start the game with three Pac-Men. If your score exceeds 10,000 points you are given one extra man. Your red control knob (or "joy stick") determines the Pac-Man's direction, but the speed of the figure is automatic and out of your control.

SCORING POINTS

As the Pac-Man travels the permissible paths, he consumes the "dots" and "energizers" in his path. "Dot" refers to one of the 240 constant (non-flashing) dots on the board, and an "energizer" is one of the 4 flashing dots. Each standard dot is worth 10 points, and each energizer is worth 50 points.

After you consume an energizer on one of the early game boards, there is a brief period of time wherein the monsters turn blue and flash. They are vulnerable during this time. If you consume any of them during this period, they return helplessly to the "monster pen" and you accrue points as follows:

- 200 points for the first monster consumed
- 400 points for the second monster consumed
- 800 points for the third monster consumed
- 1,600 points for the fourth monster consumed

There is a general trend for the vulnerable period to shorten as the game progresses.

One of a number of bonus symbols appears periodically at point **B** in Figure 1. If you consume the bonus symbol during its brief appearance, you get points as shown in the table on the next page.

<u>Board #</u>	<u>Points</u>	<u>Bonus Symbol</u>
1	100	Cherries
2	300	Strawberry
3,4	500	Peach
5,6	700	Apple
7,8	1,000	Pineapple
9,10	2,000	Galaxian Man
11,12	3,000	Bell
13 on	5,000	Key

There are Pac-Man fans who have different names for some of the bonus symbols, but there should be no problem understanding the bonus-symbol names chosen above.

THE MONSTERS

Four monsters begin each board in the “monster pen,” the large square in the middle of the board. From there they pursue the Pac-Man and consume him if they catch up with him. The monsters are colored pink, red, orange, and blue, and they differ in several of their characteristics. These differences are summarized below.

Monster Characteristics				
Color	Orange	Blue	Pink	Red
Name	Pokey	Bashful	Speedy	Shadow
Nickname	Clyde	Inky	Pinky	Blinky
Dangerousness	least dangerous	somewhat dangerous	very dangerous	most dangerous
Intelligence i.e., how often he captures the Pac-Man, given the opportunity	20%	50%	70%	90%
The quadrant of the board that is his primary territory	Southwest	Southeast	Northwest	Northeast

The row with the percentages shows the relative “intelligence” of each monster. For example, when the orange monster has an apparent opportunity to capture the Pac-Man, he might only capture the Pac-Man around 20% of the time (that is, around one time out of five possible captures). The blue monster captures the Pac-Man around once out of every two opportunities. These percentages are approximations, based on the authors’ experience.

Each monster has one quadrant of the board which is his “primary area.” The primary area is the part to which a monster usually retreats at certain points during the game, up his pursuit of the Pac-Man. A monster also goes to his current direction (and toward his primary area if convenient) immediately after the Pac-Man consumes an energizer. The patterns shown in chapter 4 make use of these facts. The primary areas of the monsters are depicted graphically as:

Pink	Red
Orange	Blue

Each monster’s eyes face in the direction of his current travel. As a monster sights the Pac-Man, he generally takes action to attempt pursuit (subject to the approximate

capture percentages given in the table of monster characteristics on page 12). The monsters don't take U turns unless (1) the Pac-Man consumes an energizer, or (2) it's time for one of their periodic runs to their primary areas.

The speed of the monsters is essentially constant. There are two major exceptions to this rule: (1) During a trip through the tunnel, monsters slow down slightly; and (2) when you are near the end of a board, the monsters often speed up. This is especially true of the red monster, who at such times is noticeably the fastest of the monsters.

3

General Helpful Hints

This chapter presents assorted guidelines, most of which pertain to the game as a whole and can be used at numerous times during the game. They involve trends in the game, habits and characteristics of the monsters, emergency evasive action, and similar helpful information.

Clear the Bottom of the Board First

Most of the time the monsters can trap you more easily in the bottom half of the board. Therefore, in the absence of any other goals, always try to consume dots in the bottom half of the board first. You don't necessarily have to clear the bottom half entirely, but get as many dots as you safely can before proceeding. You are especially vulnerable in the bottom row and near the two bottom corners.

Luring the Monsters

The direction of a monster's eyes indicates the direction in which he is going. To lure the monster (to follow you), it can be helpful to perform a "head fake"; the head fake consists of jerking the Pac-Man quickly and momentarily toward the monster and then quickly away again. This manoeuvre should only be attempted when the eyes face

you. You may have to position yourself into another path and back again, to ensure that you are seen by the monster. This tactic is useful to get a monster near an energizer or to make certain that he follows you into a tunnel.

Use the Tunnel to Increase Your Lead

In the tunnel your speed is increased relative to the speed of the monsters. Thus if a monster is close on your tail and you need to gain on him, duck into the tunnel when the monster is quite close to the tunnel vicinity. Sometimes you may have to give him a head fake to ensure that he is lured into the tunnel (i.e., to make sure that he sees you). You may want to use the tunnel repeatedly to foul up those monsters. Just one word of caution: Make sure that you don't have a monster at each end of the tunnel, or you'll be trapped!

Taking More Chances

Many players like to take risks in an attempt to maximize their score and add to the excitement. If you want to take a chance and go for those extra points, don't just concentrate on survival-first consume all dots except for the few around the energizers. Then lure the monsters toward the energizers (using the head fake if necessary), consume the energizer and promptly head for the monsters and gobble them up. The patterns presented later tend to play safe in many places to keep you alive at the game, rather than have you take some of the chances inherent in tracking those monsters down for extra points. However, since the energizers are normally saved for last, the pattern endings can be modified without much difficulty to custom fit your degree of aggressiveness.

Concentrate on the Smarter Monsters

The order of the monsters, in increasing intelligence, is orange (dumbest), blue, pink, and red (smartest). Therefore, when the situation arises, concentrate on the red monster, then the pink, and so on.

Monsters Go Home

Periodically during the game the monsters scatter and sometimes return to their primary area. This is done regardless of the situation they have you in (i.e., even if they have you trapped). The patterns presented later make use of this fact. Without a pattern or a stopwatch, it is difficult to accurately account for these periods and benefit from anticipation of them.

Monsters Don't Like to Go up the T's

Referring to Figure 1 (page 10), note the T-shaped islands immediately above and below the monster pen in the center of the board. The monsters essentially never go up the stems of those T's unless either (1) they are blue or flashing or (2) they are in the midst of one of their periodic scatter manoeuvres. Thus if you are being chased, going up a T prevents your being gobbled up.

Go Around Corners

When you are being chased, zigzag around several corners – when going around corners, the monsters' speed slows down relative to the Pac-Man's. Repeat this manoeuvre enough times to give yourself a large lead.

Dots Slow You Down

As you consume dots, your speed slows down slightly.

Therefore, when a monster is close on your tail it may be to your advantage to forget the dots and choose a path without any.

Don't Worry About the Orange Monster

The orange monster moves essentially independently of your position. He will rarely intentionally corner you, even if you are in a potentially vulnerable position.

The Bonus Symbols

These symbols appear suddenly at various times during the game at the point **B** in Figure 1. During the early phases of the game, concentrate on survival, energizer consumption, and monster consumption. The bonus symbols should be a secondary goal, which you go for if you are in good shape.

Boards Following the Intermission Shows

After completion of Boards 2, 5, 9, 13, and 17, there are cartoon intermission shows. Except after the first show, on the boards immediately following each intermission (Boards 6, 10, 14, and 18) the monsters stay blue longer after the Pac-Man consumes an energizer. To be more specific: At Board 6 they stay blue about as long as on Board 1; at Board 10 they stay blue as long as on Board 2; at Board 14 they stay blue as long as on Board 4. It is therefore desirable to try more aggressively to consume monsters on these boards.

Monsters in the Tunnel

If any monster is in the tunnel at the moment you consume an energizer, he will exit from the tunnel at the point he entered it (i.e., he reverses his direction). This knowledge is useful when striving to consume monsters for extra points.

Monsters' Starting Moves

At the start of each board, the monsters go toward the extreme corners of their primary areas of the board before chasing you.

Energizer Consumption

Immediately after you consume an energizer, the monsters initially go exactly opposite to the direction in which they were going. The Pac-Man goes faster for the brief period when the monsters turn blue. Thus you may want to consume the energizers at a time when one or more monsters are in close pursuit. If possible, try to consume all the normal dots around the energizers when you consume the energizers and before chasing the monsters; those few stray dots here and there may become difficult to pick up later, especially if there are several small bunches scattered all over the board.

Another point related to energizer consumption is this: After consumption of one energizer, don't consume a second energizer while a monster's eyes are still on their way back to the monster pen. If you did, that monster would be lucky and avoid its vulnerable period following the second energizer consumption. Don't make it any easier for those monsters!

Monsters Leaving Their Pen

A monster is harmless if it is not completely out of the monster pen in the center of the board. Knowledge of this fact can occasionally come in handy. Also, note that the monsters usually leave the pen one at a time. Thank heaven for small favors!

The Safe Spot

There is one spot on the board where the Pac-Man may stay temporarily and not be consumed by the monsters. You

should, however, reach the safe spot at a time when no monster is looking directly at you, and you should approach it from the south. This spot is in the south part of the board and is indicated by **SS** below:



Save Energizer Consumption Until Last

All other things being equal, it is preferable to consume the energizers toward the end of a given board. It's a nice reassuring feeling to know that they are there as a safety valve in times of trouble, like when you are being pursued quite closely by the red or pink monster. Here's a tip for the more aggressive player interested in maximizing his or her point total: When you consume that last energizer on the board, save at least one normal dot for later. Clearing the entire board at that time would leave you no time to consume monsters since a fresh board would start immediately.

Turning Corners

The best cornering approach is always to take corners as quickly as possible. Often players think that they are cor-

nering as rapidly as possible and are unaware of a slight delay. Sometimes it is even difficult for a more advanced player to convince a beginner that he or she is not turning corners at the maximum possible speed. If you have not perfected your cornering technique, the following information is of vital importance to you.

When you are on a straight section of a path and are approaching a turn, you should anticipate the turn and start moving the joy stick in the new direction before the actual intersection. This should not be done too early (lest the Pac-Man turn into the wrong path), but neither should it be done too late, when the Pac-Man is already in the intersection. Look at the diagram immediately below:



Let us say that the Pac-Man is at point X, that he is heading in the direction of the arrow, and that you would like him to turn left into path Z. Pushing the joy stick up at point 1 or 2 would be too early and would lead the Pac-Man up path Y, the wrong one! Pushing the joy stick up at point 5 would be a bit late, since the corner would be rounded with some slight delay. Pushing the joy stick up at point 3 or 4 is the best approach. Once you are safely past point 2 you can push the joy stick up and the Pac-Man will continue to go straight ahead until the next possible place to turn upward.

The general idea is that after you round each corner,

you should anticipate your next turn and *push the joy stick in the target turn direction before that target intersection*. It's much better to be a little early than a little late!

Follow That Monster!

Imagine that you are in or near a corner (or in some other vulnerable position) and it looks as though you are about to be trapped by two or more monsters. Sometimes while you are in such a situation one of the monsters will turn and start to go in the opposite direction. When this happens, you should follow that monster to safety. Follow him for as long as you like – provided that he keeps on going and looking away from you. Many dots can often be consumed during this process, too.

4 The Patterns

This chapter presents specific, complete winning patterns for each of the sequential boards during the game. Since the Pac-Man game pieces move at predetermined speeds, timing is important in following these patterns. When applying them, do not delay. Following the exact pattern, without hesitation or detour, should bring success to any player of the original Pac-Man game.

Should you detour or deviate from a pattern for any reason, keep in mind the general guidelines given in Chapter 3 as you attempt to clear the board. Then return to the suggested patterns from the next board on.

To benefit from these patterns you should commit them to memory. There are blank boards in chapter 8 for you to practice on. When you are confident that you have memorized a pattern, then you can try it on the real game. Trying to apply a pattern before you have it firmly memorized can lead to a frustrating session at the game. You should almost be able to see the pattern in your sleep!

We recommend that you first concentrate on the earlier boards, omitting study of the higher-board patterns until you have mastered the earlier ones completely.

To aid in identifying the various boards, remember that in the original Pac-Man machine mini-breaks or intermission shows appear after boards numbered 2, 5, 9, 13, and 17.

There are five different patterns presented:

- One for Board 1
- One for Board 2
- One for Boards 3 and 4
- One for Boards 5 through 20
- One for Boards 21 and higher

In the following pages you will find patterns for each board, along with helpful comments. For the sake of clarity and readability, the pattern for each board is shown in two parts, A and B. Memorize both; apply part A and then continue *immediately* with part B.

For all patterns, you start at point **S** for part A of the pattern and point **SB** for part B. Just keep following the direction of the arrows in the figures. The point labeled **F** in part B of the pattern represents the finishing point for that board's pattern.

Pattern parts A and B for a particular board are placed on facing pages, so you can see what the total pattern for that board looks like. Study them one part at a time. Following the patterns is a section on memory aids. A summary of the complete pattern set, with each board's pattern divided into four segments, is presented on pages 40 and 41; it should be helpful as a review.

Important

Speed and *timing* cannot be overemphasized as crucial requirements for the success of these patterns. A slight delay when rounding a corner could throw off the rest of the pattern for the board. If it appears that you are having trouble while following the exact pattern, then you probably need more practice rounding corners. Cut them as sharp as you possibly can. Remember: *Practice is the key to success.*

In addition to the above advice, keep in mind that the joy stick does not have to be pushed or squeezed hard. Push it gently – but quickly enough to corner sharply.

If timing problems force you entirely off a pattern, use the zigzag moves and tunnel crossings (repeatedly if necessary) to gain some elbow room. Consume energizers if the situation gets to be an emergency.

THE PATTERNS FOR BOARDS 1 THROUGH 4

- No head fakes are used on any of these boards.
- No tunnel trips are necessary for Board 1 if you follow the pattern exactly. Boards 2, 3, and 4 each require one trip through the tunnel.
- To score additional points on Boards 1 through 4, you may want to delay your consumption of the energizers until the monsters are very close to the energizers. If you do so, you will deviate on the end parts of the patterns.
- The patterns for Board 1 and Board 2 do not go for the bonus symbol, but concentrate instead on survival. This is not a great loss, since you don't get very many points for the bonus symbols on those boards.
- Remember to round those corners sharply!! This especially applies to the parts where you have to make a series of turns in close succession. If the monsters catch you during the first part of the pattern, it means that you are not rounding the corners quickly enough.
- If you miss a dot or two, try to ignore it temporarily and stay with the pattern as long as possible. You can always go back later and pick it up (for example, immediately following consumption of an energizer). This is a strategy that applies to *all* boards.

- Perfecting your first board pattern is a big accomplishment which may not be easy. But remember this: Once you have perfected one, you have a good foundation and a better chance of perfecting the higher boards. If you can do it for one, you should be able to do it for more!

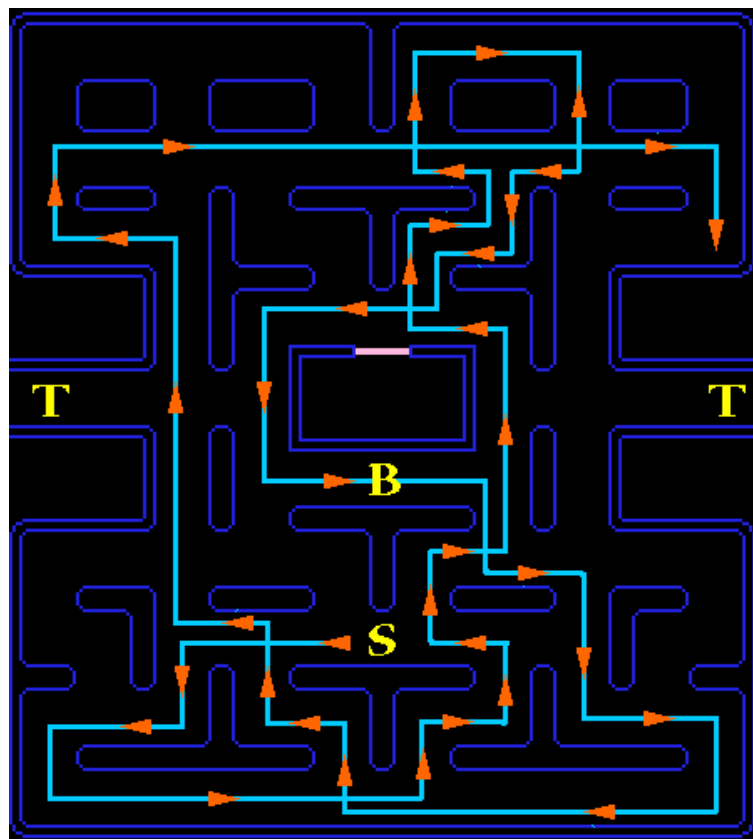


Figure 2. Pattern for Board 1: Part A

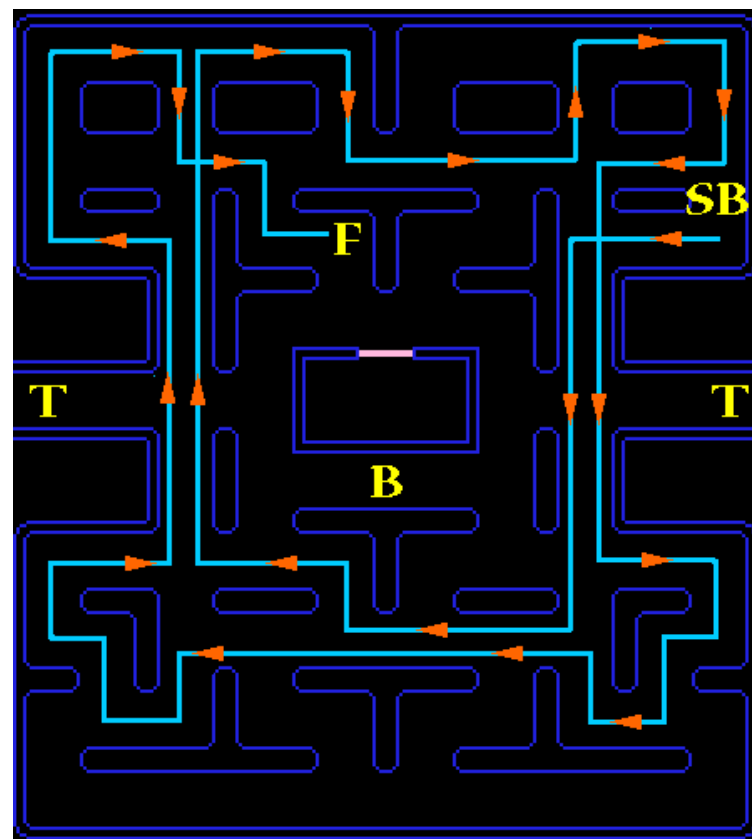


Figure 3. Pattern for Board 1: Part B

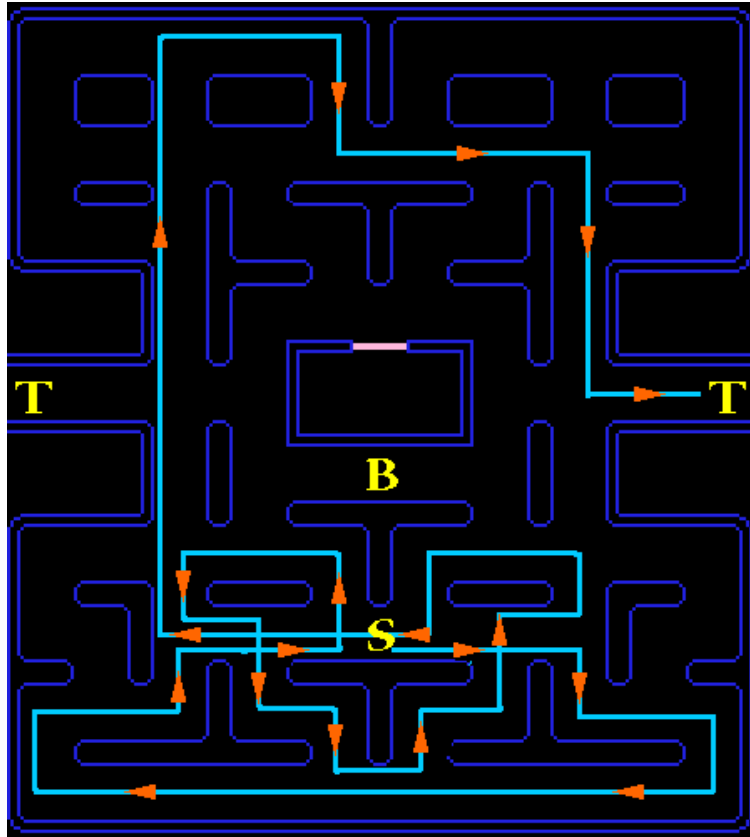


Figure 4. Pattern for Board 2: Part A

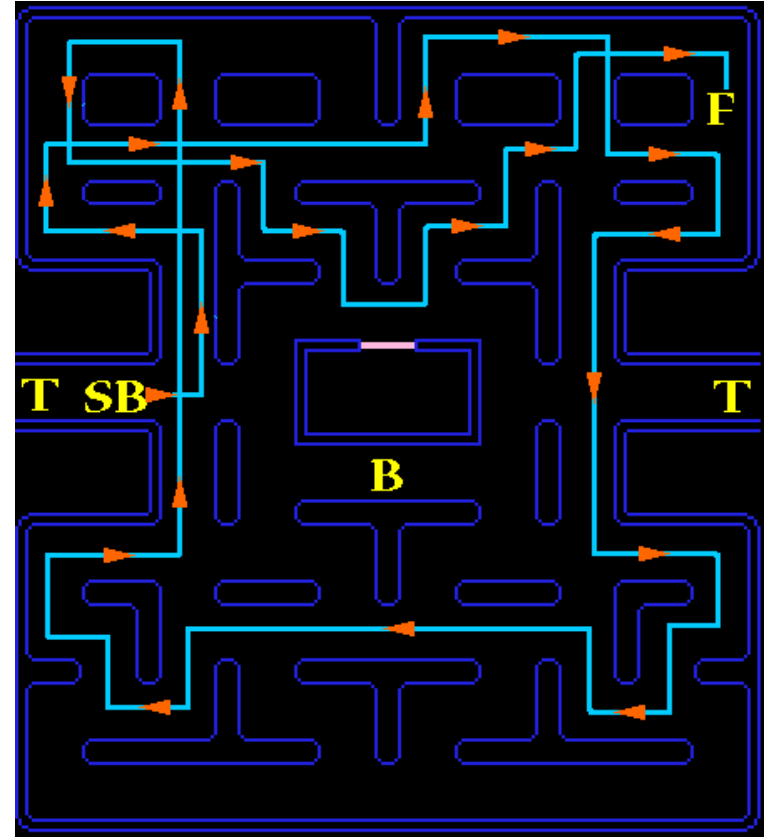


Figure 5. Pattern for Board 2: Part B

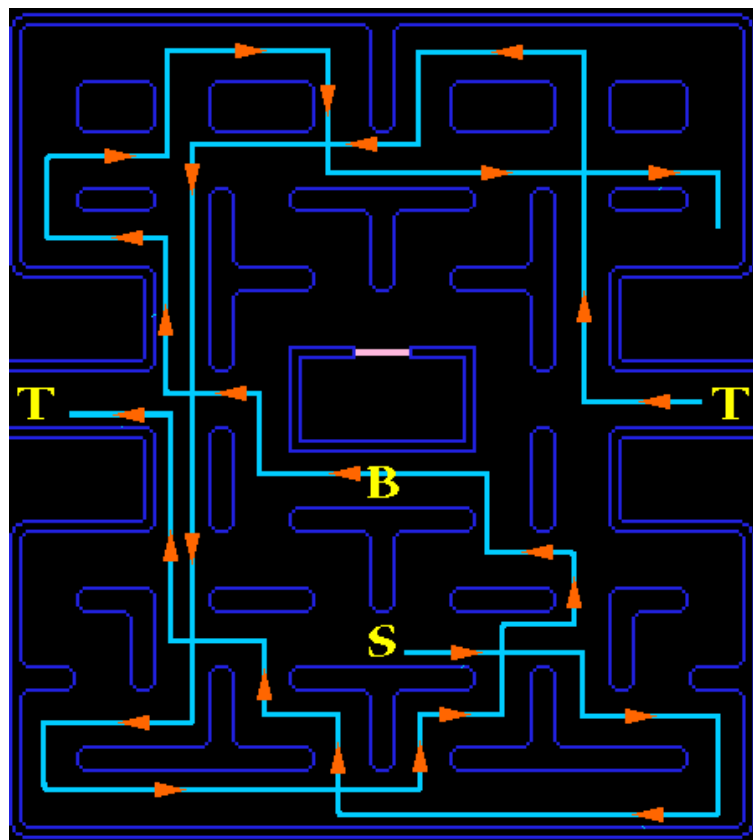


Figure 6. Pattern for Board 3 and 4: Part A

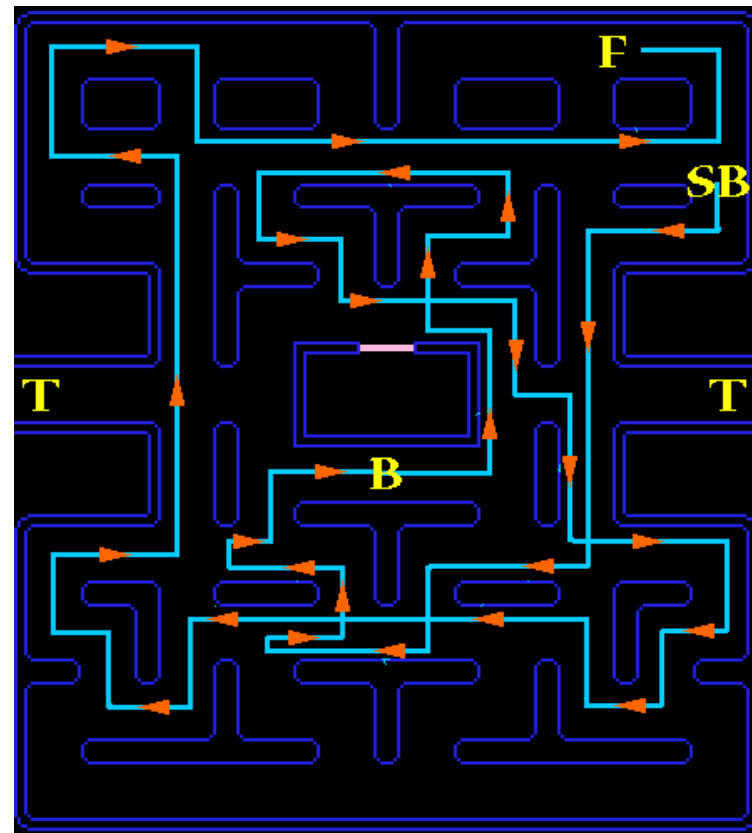
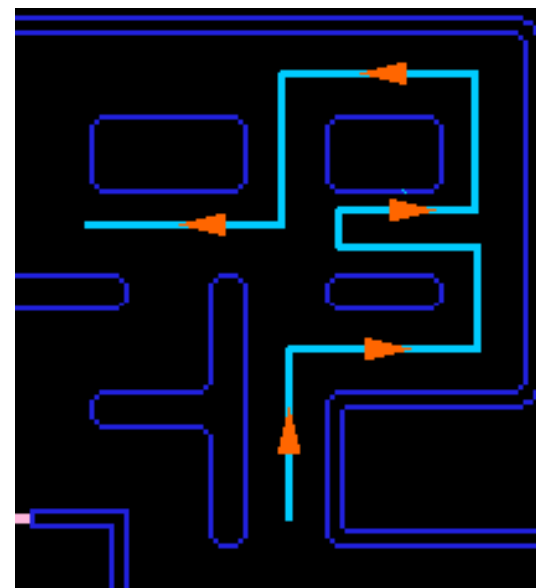


Figure 7. Pattern for Board 3 and 4: Part B

THE PATTERN FOR BOARDS 5 THROUGH 20

- **Locate checkpoint *C1* in Figure 8.** The first time you pass near it (to the left of it), go straight up and to the left, leaving those dots to your right where they stand. The second time you pass near point ***C1*** you are going down on the right side of it. At this time, make a rapid zigzag to the left and back again to clear all remaining dots in the area. Try to do this as rapidly as possible to guarantee that you consume all dots and still keep your rhythm in the north – south direction. This may require practice. When you perform the zigzag at point *C1*, the red, blue, and pink monsters should be right on your tail if you are executing the pattern properly.
- Notice the trip through the tunnel during part A of the pattern. The red monster should enter the tunnel after you if your timing is correct.
- See Figure 9 for part B of the pattern for Boards 5 – 20. This involves two trips through the tunnel. Point *T2* at the right-hand edge of the board connects you with point *T2* at the left-hand edge: You leave the board going to the right and return from the left. Similarly, one point *T3* connects with the other *T3*, but this time you leave the board going to the left and return from the right.
- For *Boards 5 through 12 only*, the following applies: The second and third times you are about to enter the tunnel (see points ***T2*** and ***T3***), you should do a zigzag head fake to delay slightly and ensure that the monsters follow you into the tunnel. The points where you do so are marked ***H*** in Figure 10. If your timing up to that point is good and your head fake works, two or three monsters will follow you in. (If three follow you in, you’ve mastered the pattern!)

- For *Boards 13 through 20*, this applies: Locate point *N* in Figure 9. At *N* you are heading north and are about to make a left turn into the tunnel. The blue monster will be going south in that same corridor about to turn into the same tunnel. If it appears that you can beat him into the tunnel, proceed and do so. If it looks like he will beat you to the entrance at *T3*, delay in place and let him into the tunnel first. *He will go into the tunnel, regardless of your move at N.* But remember not to follow him too closely into the tunnel, since his speed decreases slightly there.
- For *Boards 17, 19, and 20* a slight variation of the pattern is required on your last trip (part B) through the northeast quadrant of the board, because the monsters don't turn blue then after energizer consumption. (Board 17 is indicated by five keys at the bottom of the game display.) The variation is shown below:



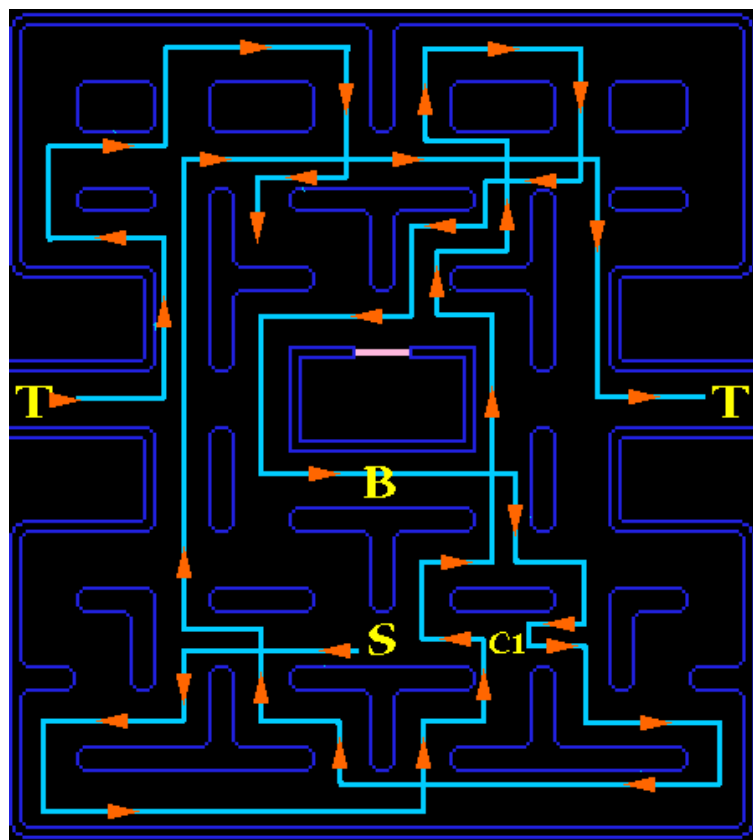


Figure 8. Pattern for Boards 5 through 20: Part A

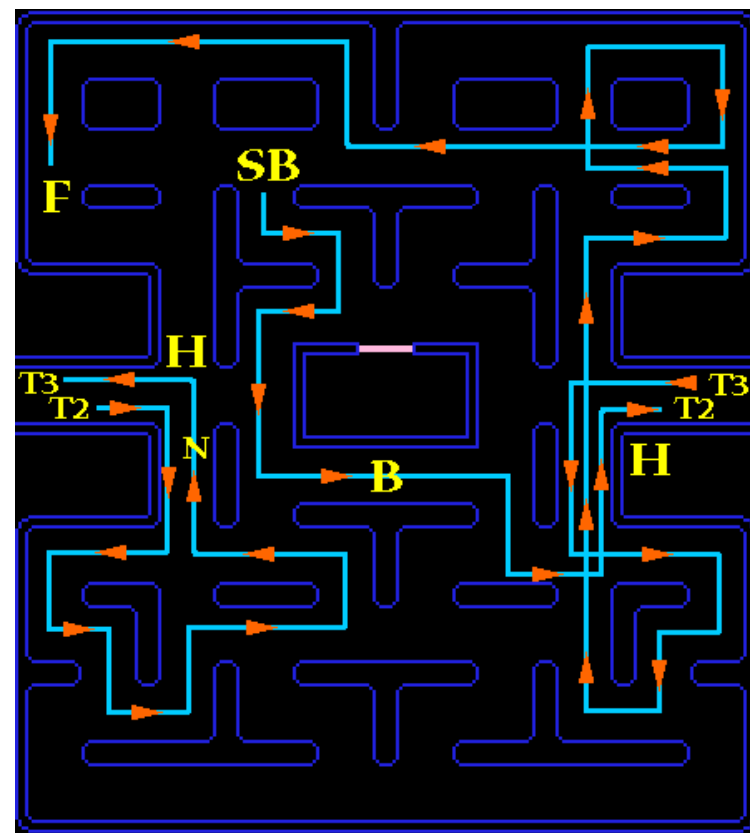


Figure 9. Pattern for Boards 5 through 20: Part B

THE PATTERN FOR BOARDS 21 AND HIGHER

- You know you're about to start Board 21 when the ninth key appears. Since only the last seven bonus symbols are displayed at the bottom of the board, you will have to notice when it fills up with keys (at the start of Board 19) and count two boards past that.
- In this part of the game, the Pac-Man seems to slow down and the monsters seem to speed up. It appears that the Pac-Man is actually slower than the monsters at times. There is now an even greater demand that your cornering be clean,

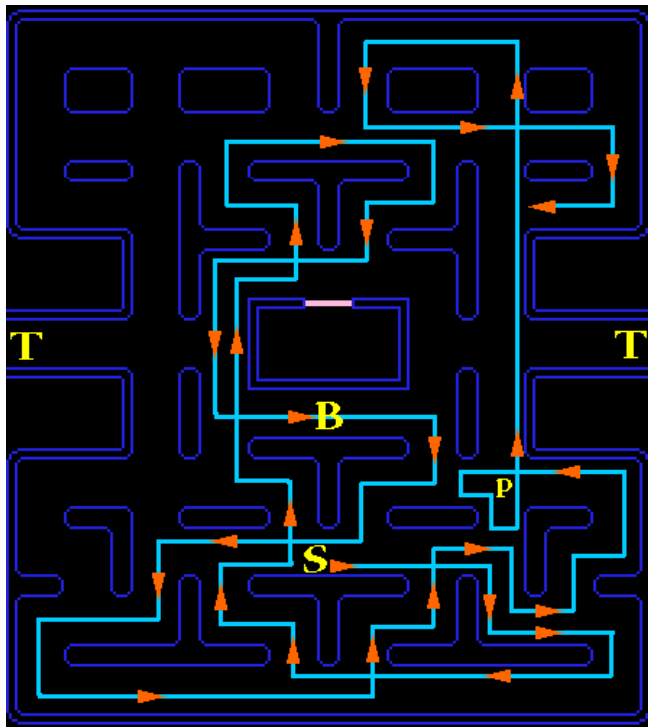


Figure 10. Pattern for Boards 21 and Higher Part A

crisp, and precise. A turning delay of a small fraction of a second may be fatal. And if you deviate from the pattern, you will now have a much more difficult time recovering!

- At point **P** in Figure 10, you should pick up two dots with the double-zigzag move shown. This is perhaps the most difficult move in the entire game. Point **Q** in Figure 11 represents another zigzag move. Again, if you miss a dot, proceed with the pattern. You can come back for that dot toward the end of the board.
- It should take just 48 seconds to execute this pattern.

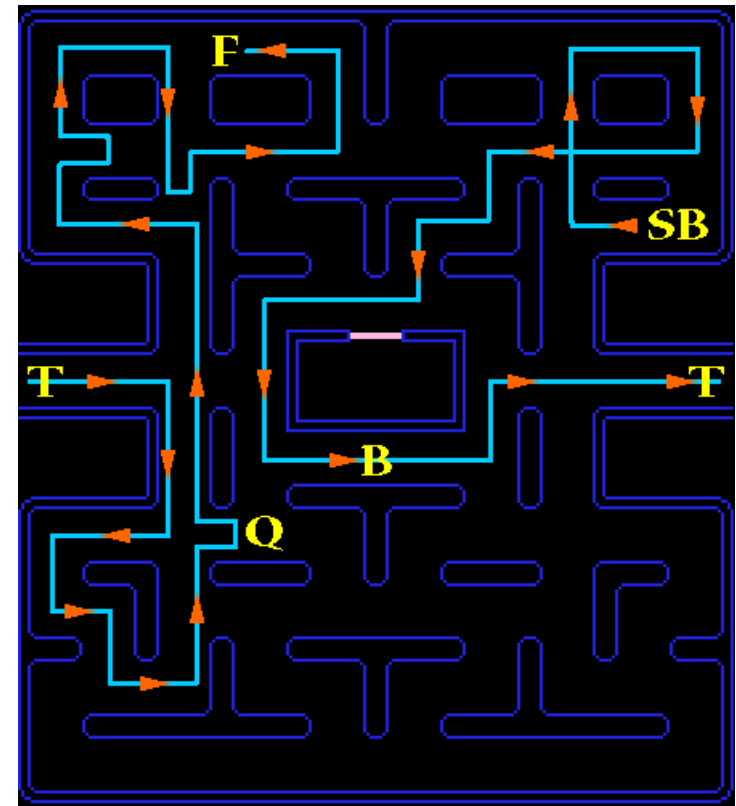


Figure 11. Pattern for Boards 21 and Higher Part B

MEMORY AIDS

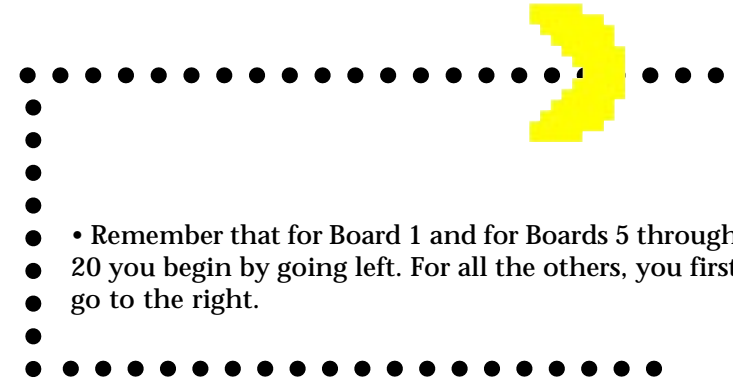
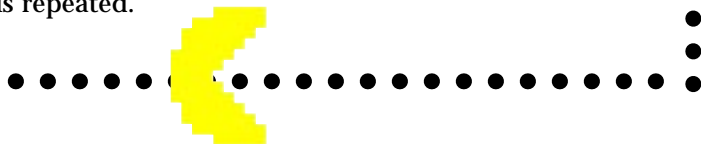
- As suggested earlier, probably the best approach to memorizing the patterns is to practice them on the blank game boards provided in chapter 8. There is just no substitute for repetition and practice!



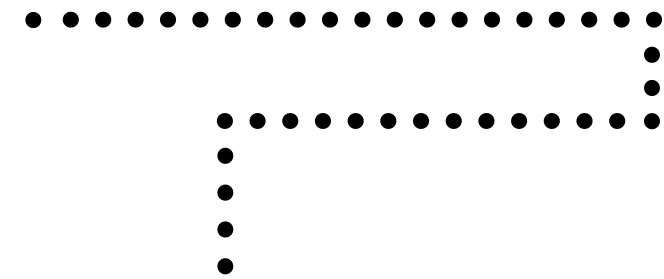
- By now you should see the advantage of our having split each pattern in half. Some players may find it even easier to commit to memory the quarter-pattern segments presented on pages 40 and 41.



- It may be helpful to recognize the similarities that exist among patterns. Almost always, the four corners (more specifically, the energizer areas) are completed last. Also notice that for Board 1 and Boards 5-20, the patterns are identical for about their first quarter. You may also spot a “subpattern” (a part of a pattern) that is repeated.



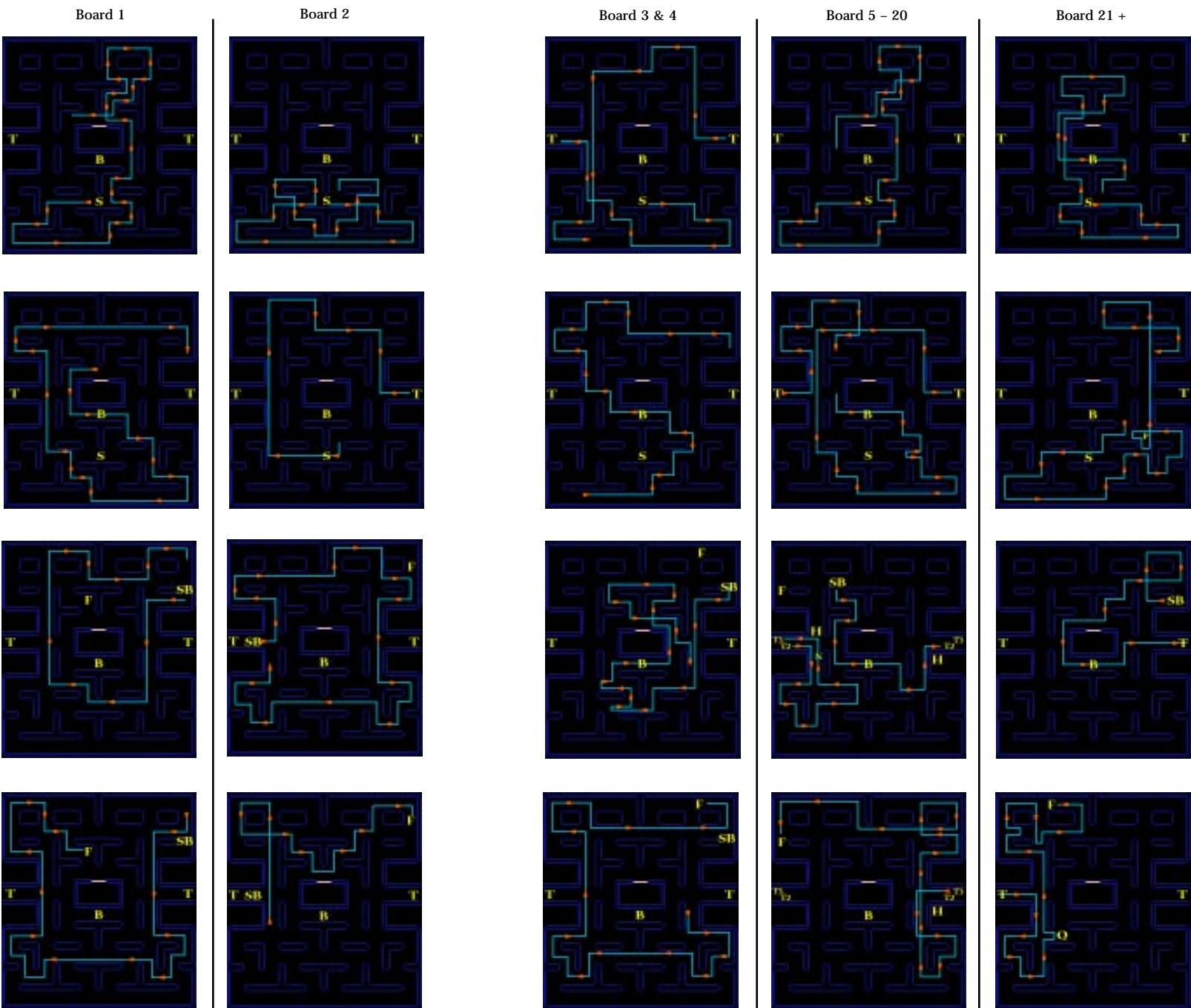
- Remember that for Board 1 and for Boards 5 through 20 you begin by going left. For all the others, you first go to the right.



- Pages 40 and 41 contain a simplified presentation of the patterns for all the boards. Each board's pattern has been divided into four segments. As you read down a column, you see the first segment of part A, the second segment of part A, the first segment of part B, and then the second segment of part B (which finishes play on that board). Unnecessary background details have been eliminated for the sake of clarity. This may help you memorize the patterns and also perceive similarities between them. (For example, compare part A of Board 1 and part A of Board 5. How do they differ?)



Figure 12. Summary of All Patterns



5

Applying the Patterns to a Modified Pac-Man Machine

Although any number of future changes to the original Pac-Man machine are possible, at present there appears to be one widely distributed modification of the original. You can identify one of these machines as follows:

Find point **M** in the southwest corner of the board in Figure 1 (page 10). In the pregame show, if Pokey (the orange monster) traps the Pac-Man at point **M**, then the material in this chapter should apply to that machine.

In these modified machines, the original Boards 1, 3, 6, 19, and 20 are eliminated. The table on the next page compares the original Pac-Man machine with this modified version.

ORIGINAL MACHINE		MODIFIED MACHINE	
Board#	Bonus Symbol	Board#	Bonus Symbol
1	Cherries	*	*
2	Strawberry	1	Cherries
3	Peach	*	*
4	Peach	2	Strawberry
5	Apple	3	Peach
6	Apple	*	*
7	Pineapple	4	Peach
8	Pineapple	5	Apple
9	Galaxian Man	6	Apple
10	Galaxian Man	7	Pineapple
11	Bell	8	Pineapple
12	Bell	9	Galaxian Man
13	Key	10	Galaxian Man
14	Key	11	Bell
15	Key	12	Bell
16	Key	13	Key
17	Key	14	Key
18	Key	15	Key
19	Key	*	*
20	Key	*	*
21 on	Key	16 on	Key

*Board has been deleted in the modified machine

What this table means is that Board 1 of the original machine has been eliminated, so you don't use the Board 1 pattern on the modified machine. The first board you see

on the modified machine is the equivalent of the original Board 2; however, it has the cherries shown as the bonus symbol!

If you play on one of these modified machines, you can use the patterns given earlier in the book as follows:

- For the first board, use the pattern for Board 2 from the original machine
- For the second board, use the pattern for Boards 3 and 4
- For boards 3 through 15, use the pattern for Boards 5 through 20
- For boards 16 on, use the pattern for Boards 21 and higher.

6

Developing Your Own Patterns

Trying to tell players how to develop their own patterns for Pac-Man games is not an easy task. When most people develop (or attempt to develop) patterns, they are probably not conscious of exactly what they are doing or how they are doing it; it is something that they just go ahead and do. But there are a number of points that we feel can be helpful to players in the continuing quest to develop their own patterns.

The *initial part of a pattern* is usually very important. It sets the stage for the middle of the pattern, the onset of which is often the part where some very close calls with the monsters are encountered. In the original Pac-Man machine and the modification we described in chapter 5, it often seems like good strategy to clear a lot of the lower part of the board first. This is because the monsters are not down there initially on those machines, and because the red monster begins his search in his primary area which is in the upper half of the board. However, at least one modified machine was discovered by us where the red monster begins by going to the southwest corner and proceeds to terrorize the Pac-

Man in the lower half of the board almost immediately. Even before we put money into the machine, we knew it was a different modification because in the pregame show the Pac-Man was captured in the southeast corner of the board. On such a machine, a good bet might be a pattern which clears only a tiny bit of the southwest-area dots and then immediately heads on a diagonal run for the northeast corner of the board. In general, a suggestion for the first phase of a pattern may be to initially clear areas where there are no monsters (and especially where there is no red monster).

Another bit of advice for the initial part of a pattern: Whenever possible, try to go only on paths where there are dots not yet consumed. This will leave more blank path portions, which you will appreciate being able to travel down later – when the extra increase in speed is necessary to escape from a monster.

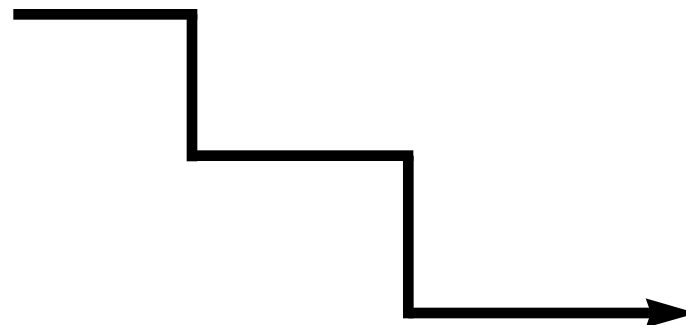
During the *early-middle and middle parts of a pattern*, you may encounter situations where three or four of the monsters seem to be synchronized and heading for the same general area of the board (or at least in the same direction). You may then want to take special action so as not to be too close to an extreme corner of the board or even to an extreme edge of the board if that area is considered to be a target (or close to a target) of their joint direction. Being more toward the middle of the board (or near a tunnel) at such a time can keep you from being cornered.

In the middle phase of the pattern, you will also want to plan your path so that trips across the middle of the board are at a time when the bonus symbol is present there. This, of course, is for players who are greedy for those extra points!

Toward the *late stages of a pattern*, the primary target for the Pac-Man will probably be the energizer areas and paths leading to the energizers. These paths could be inten-

tionally avoided at the beginning and middle parts of the pattern, since you will have to go over them anyway near the end to get to the energizers. Exactly what you do following energizer consumption will depend on how aggressively you plan to pursue the monsters for additional points. Also, if you are being really shrewd, you may want to somehow delay in your path toward the energizer, to lure the monsters to bunch up behind you. That would allow you to consume the energizer and immediately turn on the monsters for additional points.

Depending on how you started your pattern, at the late stages certain subpatterns may be very useful and perhaps even unavoidable. Some of the valuable subpatterns are discussed now. One is the *staircase subpattern*, which looks like this:



The staircase subpattern is useful because it clears a lot of dots in a given area, and also because the series of consecutive turns allows you to gain relative to the monsters. In near-emergency situations, a pattern might specifically plan to have a series of staircase or zigzag moves to add to your lead on the monsters – perhaps just long enough to allow you to beat them to an energizer.

Another beneficial subpattern is the “up the T” subpattern, which resembles one of these:



This is useful because, as stated earlier, the monsters rarely go up the T's.

When there is one path with many dots and another leading from it with just one or two dots (such as is illustrated on the left below), then you may want to go down the main path and just zigzag off and back again to pick up those stray dots (see the right side below). This may be better than going down an almost blank trail just to pick up a dot or two.



Planned repeated use of *the tunnel* could also fit nicely into many patterns. Don't be afraid to use it often.

Timing is extremely important in the development of patterns and while you are doing pattern research. Patterns are only repeatable if your speed is consistent. All during the development and use of a pattern, you must strive to keep your speed perfectly constant and at the maximum possible for best results. Your cornering moves should actually anticipate the corner to rule out unnecessary delay.

Here's another point to remember when developing patterns: When the monsters scatter as they do periodically, that could be an excellent time for you to go and clear one of the more difficult areas of the board. These would include corners and the perimeter edges of the board which are farthest from the energizers (for example, the bottom edge).

And another possibility to keep in mind is that a pattern that works for one board might work for one or more other boards, too. In the original Pac-Man machine, of course, the pattern that works for Board 5 works for many other boards. Thus when you've found one good pattern, don't be afraid to try it on earlier or later boards also. You've got to be bold in your experimentation. In a few “new” machines we've seen, a pattern for Board 3 or 5 worked for several more following.

Many people can readily commit patterns to memory during pattern development, and many more cannot. For those who cannot memorize quite so quickly, working in pairs is recommended. One can act as a recorder, marking down the pattern (or parts thereof) and noting certain key happenings away from the Pac-Man. The recorder can also time moves with a stopwatch if appropriate.

As a finishing note on this subject, keep in mind the set of helpful hints given in chapter 3. And be patient! Trial and error are unavoidable on a strange machine (as you well know) and even on a familiar machine that has undergone some modification. Hang in there, and don't be afraid to try something new.

Well, there you have it. We've told you all our secrets for mastering Pac-Man. The rest is up to you. You can use all the material presented, or just the parts you like. Just remember: The final result will depend on what you have to start with and what you're willing to put into it.

Good luck!

7

Ms. Pac-Man

As the 1982 calendar year began its cycle, a new and different electronic video game slowly emerged. It sprang up here and there, starting to establish roots in arcades of some of the larger cities, perhaps in hopes of spreading outward from there to the more distant and remote videogame breeding grounds. What is this game that looks somewhat familiar? It resembles Pac-Man, yet there is a strange and foreign atmosphere to it: It appears more feminine and inviting. The colors and trimmings somehow seem more appealing. But beware, it could be a “tender trap.” Its name is Ms. Pac-Man.

Although it is attractive and seemingly irresistible, this pretty little thing can be treacherous, devious, and underhanded. Be forewarned: This is a cold-hearted and foxy little piece of electronics; it will get your hopes up, lead you on, spend your money . . . and leave you lonely.

What is there about this machine that makes one react in such a way and describe it in such terms? Well, it is definitely more challenging than our old friend Pac-Man.

But what has made it so much more difficult-just the fact that it is new and unknown? Just because we are not used to it and haven’t uncovered all its secrets yet?

No, we believe it is more than that. Something unusual and uncanny has been done to Pac-Man-type machines. Something crafty and cunning has penetrated the electronic circuits and semiconductor chips to make Ms. Pac-Man exhibit random behavior. Something shrewd and sly lives under that case and schemes to break our hearts. Just when we think we have figured something out that could lead to a nice pattern (or even to a nice piece of a pattern), we run that identical scheme of travel in the same maze at another time, and those darn monsters behave differently!!!

Could this really be happening?

It certainly appears so!

Can patterns be figured out for mastering such ingenious technology?

Can it be conquered by any means?

Can it be stopped at all?

We don’t yet have the complete answers to these questions-this machine will surely take more time and study than did the original Pac-Man. Our battle is not over yet, but it certainly has begun. Read on, and learn what we have accomplished thus far in the challenge to master Ms. Pac-Man!

DESCRIPTIVE INFORMATION

As stated above, the general appearance of the machine is similar to the original Pac-Man machine. Our round, yellow Pac-Ma’am has feminine trimmings which include a ribbon in her hair and big rosy lips. The general idea of the game is the same. The Pac-Ma’am winds her way through the maze consuming dots, bonus symbols, energizers, and even the monsters if they are vulnerable. The same four monsters pursue the heroine. There are still intermissions after Boards 2 and 5; these animated intermissions now include both

masculine and feminine Pac figures to add a touch of romance to the excitement. And the game still costs twenty-five cents (at least in every machine we've encountered).

But that quarter will probably not last you as long; and what's more, it seems that the likelihood of having a long game is very low! If you accept the challenge of this machine, you'd best be prepared for a difficult time and lots of frustration.

The speeds and intelligences of the same four monsters seem to be of the same order as on Pac-Man machines; for example, the orange monster is the least intelligent and least dangerous. The monsters' speed, however, seems to approach the speed of the Pac-Ma'am much earlier in the game. At later boards especially, the monsters seem to act very fast and very smart. And what really complicates the issue is that their behavior appears to be *random*. For example, if you play the same pattern on Board 1 on two consecutive games at the same machine, the monsters may behave differently for those two identically executed patterns. This can present a real problem.

There is a different set of bonus symbols, whose corresponding points and boards are as follows:

Board#	Points	Bonus Symbol
1	100	Cherries
2	200	Strawberry
3	500	Peach
4	700	Pretzel
5	1,000	Apple
6	2,000	Pear
7	5,000	Banana
8	?	?

At the eighth board, a *random* fruit appears. As far as we've observed, this random fruit will be one of those listed above.

To make things more challenging, the fruits are constantly in motion. They enter the board from one side tunnel, dance around a bit on the board, and then exit if you haven't properly intercepted them. (The first time you see this, you may neglect the monsters and just admire the show!) On its second appearance, a fruit enters via the other side. This all complicates the issue and does indeed make it harder to create patterns that gobble up high-point fruits.

The board layout itself also varies. This is a big difference from the original Pac-Man. Now you have one board layout for Boards 1 and 2, another maze for Boards 3, 4, and 5, and yet a third board layout for Boards 6, 7, and 8 (and who knows what beyond that). The board layout for Boards 1 and 2 is shown in Figure 13; and for Boards 3, 4, and 5 in Figure 14.

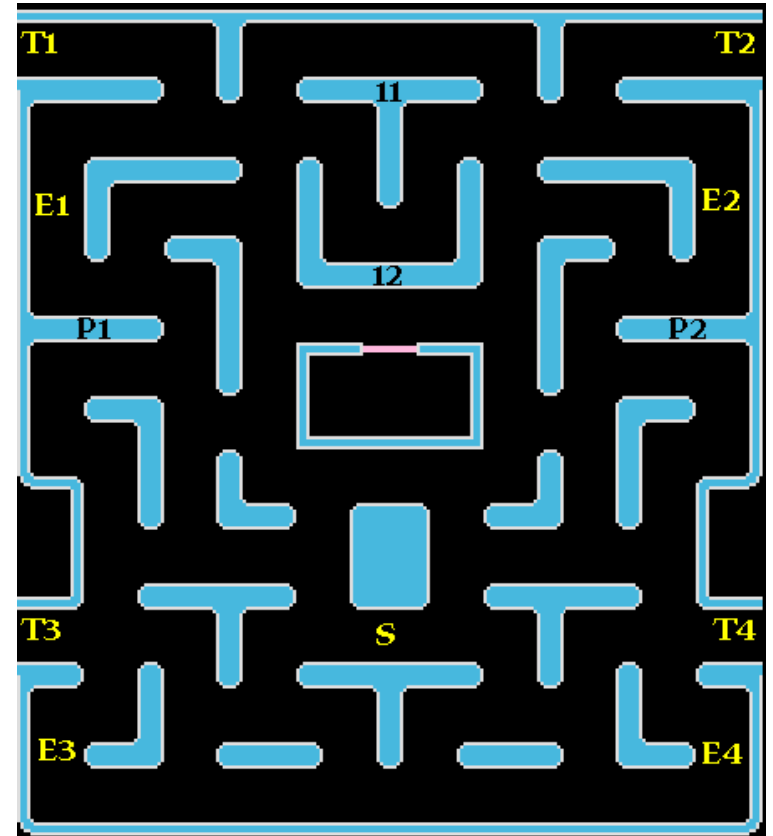
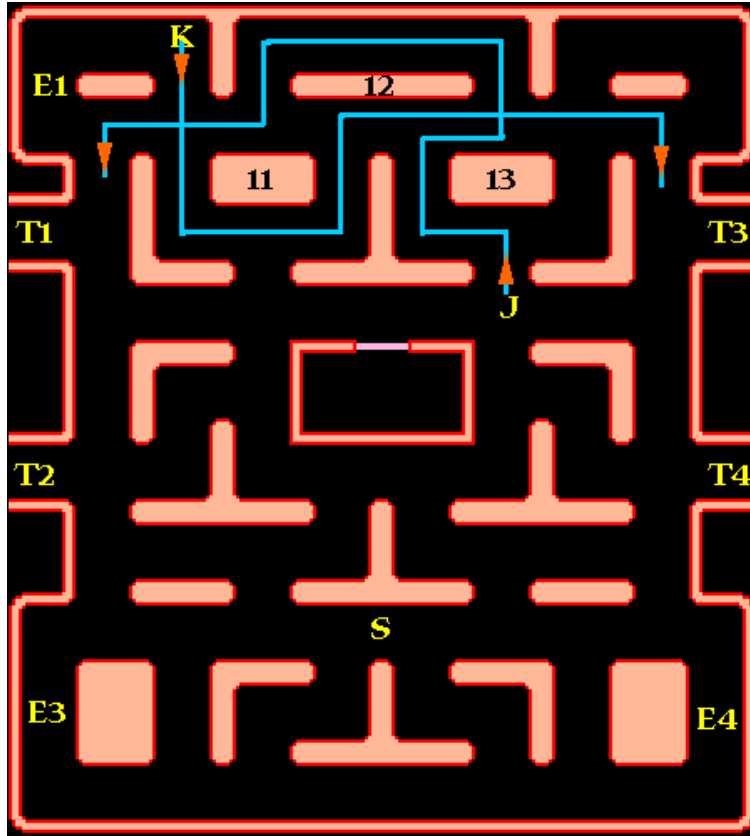
The starting point for both arrangements is indicated by **S**. The energizers are marked **E1**, **E2**, **E3** and **E4**.

Notice that you have four tunnels (at least up to Board 5); the number decreases to two tunnels after that. Also, the tunnels are shorter now. Look at the uppermost tunnels (**T1** and **T2**) on Boards 3 through 5; because of the surrounding geography, it could be a lot easier to get trapped around the tunnel area!

And as if all this isn't enough, you now must get 20,000 points to get an extra Ma'am rather than the 10,000 points it takes to get an extra Pac-Man.

HELPFUL HINTS

Despite all these features that make the game more demanding, we can now offer several hints that can help you survive in the game long enough to learn more and improve.



The Monsters

The same four monsters with the same four colors continually search the Ms. Pac-Man boards. Their characteristics are basically the same as in the Pac-Man game. The orange monster, for example, is the least intelligent and is definitely not the fastest. The red monster seems to be the fastest and again the most intelligent. Therefore when you are being hounded by the monsters, concentrate primarily on the red monster, then the pink, and so on.

In Ms. Pac-Man, you can't depend on the fact that the monsters don't go up the T's of the board. Our experience so far has not indicated any particular places where the monsters don't go. They all seem to go everywhere, so look out!

The Dots Slow You Down

As before, consuming dots slows you down compared to your speed along an open path. In Ms. Pac-Man, this slowing effect is much more pronounced and occurs much earlier in the game. As early as Board 3, this speed decrease of the Pac-Man is very noticeable and can allow the monsters to catch her from behind. And after Board 5, you've *really* got to look out for this. This phenomenon is most obvious toward the end of the boards. You will probably have to take evasive action down open paths more often and earlier than was the case for Pac-Man.

Turning Corners Helps

Turning corners without delay can allow you to pick up some speed and lead distance relative to a pursuing monster. The advantage thus gained is slight but helpful.

Some Bonus Symbols Aren't Worth Devouring

Since the bonus symbols are constantly moving and their movement may not be predictable, they are significantly more difficult to cash in on. Sometimes you start after one

with the intent of deviating only slightly from an original path or plan; however, catching up with a bonus symbol often takes longer than you thought. This detour can mean a difference of life or death to the yellow, chomping figure. Since the first few bonus symbols are worth relatively few points, we suggest that you ignore the bonus symbols for the first few boards and only gobble them up if they are right on your path and are very convenient. Only at around Board 5 (where the apple is worth 1,000 points) and higher do the extra effort and risk seem to justify much of a detour. Player greed in the Ms. Pac-Man game can be very costly! Concentrate on your original plan for clearing those dots.

Tunnels May or May Not Help

Pac-Man players develop a certain inclination and affection toward tunnels. They become your friends. The use of tunnels tends to be helpful in Ms. Pac-Man, but there are some important differences to note:

- The tunnels are shorter; therefore you don't have as much time and cannot increase your lead as much as in Pac-Man.
- The tunnels only slow the monsters down on Boards 1 through 3; after that, the tunnel itself does *not* help you increase your lead. This is the big difference from the original Pac-Man game. After Board 3, you should use the tunnel only as a means to get to the other side of the board.
- The board design around certain tunnel entrances and exits makes it easier for you to get trapped. See the upper tunnels on Boards 3 through 5. You can easily get trapped on the other (exit) side; make sure that the exit corner of the board is clear enough before you take the tunnel trip. However, because of the walls near the tunnel, it seems that the monsters are not as likely to follow you all the way into and through those tunnels.

In summary: Use the tunnels when they can help you, but

remember that after Board 3 certain tunnels may be more trouble than they're worth. Traditional Pac-Man thought processes have to be revised!

Don't Be Too Aggressive After Energizer Consumption

Our experience has shown that very often a quarter will last longer if you aren't quite so aggressive following energizer consumption. You should save consumption for as late in the board as you can. We suggest that for a start you use the vulnerable period following energizer consumption to devour only the closest monster (or perhaps two) and stick with a plan for then clearing out the corner and other nearby difficult areas. If you don't, you may end up with lots of stray dots to clean up later in a frantic finish. The monsters are vulnerable (i.e., blue and flashing) on Boards 1 and 2 for about the same length of time as on Pac-Man's Boards 1 and 2.

On Boards 3 through 5, if you cannot resist the temptation to be more aggressive following energizer consumption, we suggest that you restrict such activities to the lower two energizers (the ones farthest away from the monster pen). Especially for a novice, bold moves here can come back to haunt you.

Tough Spots for Boards 1 and 2

Inspect Figure 13, the layout for Boards 1 and 2. Notice the islands in the upper half labeled **11**, **12**, and **13**. The area around these three islands is the most treacherous. Clear this area of dots either when the area is monster-free or immediately following consumption of one of the upper energizers, **E1** or **E2**. The area above island **12** is especially dangerous!

Tough Spots for Boards 3 Through 5

Inspect Figure 14, the layout for Boards 3 through 5. In the upper center and sides, notice islands **11** and **12** and the peninsulas **P1** and **P2**. The trickiest parts of Boards 3 through 5 are those around islands **11** and **12** and the sides

of the board around **P1** and **P2**. Again, clearing these areas when they are monster-free or immediately after consuming energizers is sound strategy.

Beware When You Enter the Difficult Areas

Entering the difficult areas with monsters close on your tail or with monsters approaching the same area can be troublesome. Continue scooting through tunnels-or zigzag down empty paths-until a better opportunity comes along.

Keep Chipping Away at the Dots

This guideline applies to all dot consumption, but especially to the difficult areas mentioned above. Rather than clearing out an entire area of the board at one time, we suggest that you chip away at the area. Take some of those dots in the area now, take a few more later, and finish them off perhaps on a third trip through that neighborhood, much later. Keep that Pac-Ma'am moving and don't let her circle around or delay too long in a particular area. For example, see Figure 13, the layout for Boards 1 and 2. Note the two pattern segments beginning at points **J** and **K**. These two trips through the difficult area cover most of the dots in that region, and they need not follow one right after the other. Remember: Don't linger!

Be Conservative to Start

Since there is so much treachery around each bend on the Ms. Pac-Man board, a conservative approach is recommended. Play it just a little on the safe side. Take some risks, but not large ones. Traditional Pac-Man types of risks won't necessarily yield the same payoffs.

Be Mentally Prepared

Be ready for anything, especially frustration and rough times. But if you do apply the tips presented, you should get some positive results. Use what works, but don't be afraid to experiment!



The authors:

Ernest Zavisca (*left*) has a Ph.D. in Computer Engineering. Gary Beltowski is a high school sophomore. Gary has reached scores of over 3 million!



Do you play Pac-Man?

Do you enjoy the game?

Do you want to increase your "best" score?

Do you want your game to last longer than ever before?

Do you want to break a million?

Do you want to develop your own strategies?

Yes?

Then this is the book for you!



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Break a Million at PAC-MAN
E-Text version created by Paul Sommers

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